

REMARKS

In the present Amendment, claim 1 has been amended to incorporate the subject matter of claims 2 and 3. Claims 2 and 3 have been canceled, accordingly.

Claim 15 has been added. Claim 15 is supported by the specification, for example, page 11, 3rd full paragraph.

No new matter has been added and entry of the Amendment is respectfully requested. Upon entry of the Amendment, claims 1 and 4-15 will be all the claims pending in the application.

I. Response to Rejection Under 35 U.S.C. § 102 Over Urano et al

In Paragraph No. 2 of the Action, claims 1-2, 4-9, 11 and 14 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Urano et al (U.S. Pat. No. 5,558,976).

Applicants respectfully submit that the amended claims are not anticipated or rendered obvious by Urano et al. As noted above, Applicants have amended claim 1 to incorporate the subject matter of claim 3, which is not included in the rejection.

Further, present claim 1 recites that W is a group having an alicyclic or aromatic group. The specification further describes alicyclic groups such as a cyclopentyl group, a cyclohexyl group, a cycloheptyl group, a cyclooctyl group, a cyclononyl group and a cyclodecanyl group, and aromatic groups such as a phenyl group and a naphthyl group (page 14, 3rd full paragraph).

In contrast, in the polymer in Example 22 of Urano et al, W either is ethyl or forms a tetrapyranyloxy group with L₄. Ethyl and a tetrapyranyloxy group are not an alicyclic or

aromatic group. That is, the polymer disclosed in Example 22 of Urano et al does not meet the recitations of the present claims.

In view of the foregoing, Applicants respectfully submit that Urano et al does not anticipate or render obvious the present claims. Accordingly, the rejection should be withdrawn.

II. Response to Rejections Under 35 U.S.C. § 103 Over Urano et al

a. In Paragraph No. 3 of the Action, claim 3 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Urano et al, and further in view of Aoai et al (U.S. Pat. No. 5,837,420). Applicants note that the same rejection is repeated in Paragraph No. 6 of the Action.

Applicants respectfully submit that present claim 1, which incorporates the subject matter of original claim 3, is patentable over Urano et al and further in view of Aoai et al for at least the following reasons.

As set forth above, Urano et al does not disclose or suggest the resin of the presently claimed invention wherein W is a group having an alicyclic or aromatic group. Aoai et al does not rectify the deficiencies of Urano et al.

Furthermore, Aoai et al describes that reducing the degree of molecular weight dispersion (PD) of a polymer for KrF photo-resists provides improvement of heat resistance as well as image-forming capability.

On the other hand, the object of the present invention is to solve the problems originating from the "being exposed under a high vacuum" characteristic for electron beam or EUV-resists, i.e., a large variation of line width and the deterioration of line edge roughness when the resist is left for a comparatively long period of time in a high vacuum.

Applicants respectfully submit that facing these problems, one of ordinary skill in the art would not have looked to Aoai et al, which is related to the knowledge on KrF resists which are exposed in air (not a vacuum), for solutions. That is, there is no motivation to combine the cited references.

Although the mechanism with which the reduction of the degree of molecular weight dispersion can improve the above-mentioned properties is not clear, Applicants believe that via evaporation of the low molecular weight components of the polymer under vacuum, changes proceed in the film structure, such as void formation, etc., thereby affecting the diffusion of the acid formed by exposure. Further, a large content of low molecular weight components makes the degree of dispersion large.

In view of the foregoing, Applicants respectfully submit that present claim 1 is not obvious over Urano et al and further in view of Aoai et al, and that the rejection should be withdrawn.

b. In Paragraph No. 5 of the Action, claims 1 and 12-13 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Urano et al.

Applicants respectfully submit that the amended claims are not rendered obvious by Urano et al. As noted above, Applicants have amended claim 1 to incorporate the subject matter of claims 2 and 3, which are not included in the rejection. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

III. Response to Rejections Over JP 2002-49156

In Paragraph No. 7 of the Action, claims 1-2 and 12-14 are rejected under 35 U.S.C. § 102(b) as being anticipated by Toru et al (JP 2002-49156) ("JP '156") as evidenced by its English Abstract. Further, in Paragraph No. 8 of the Action, claims 1-2 and 12-14 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over JP '156 as evidenced by its English Abstract.

Applicants respectfully submit that the amended claims are not anticipated or rendered obvious by JP '156. As noted above, Applicants have amended claim 1 to incorporate the subject matter of claim 3, which is not included in the rejections.

Moreover, JP '156 describes that, when exposed to a KrF light, the resist exhibits advantageous effects on resolution, development defects, linearity, dry etching resistance and sensitivity.

However, as set forth above, the present invention has the object of solving the problems originating from the "exposure under a high vacuum" characteristic for electron beam- or EUV-resists, i.e., a large variation of line-width and the deterioration of line edge smoothness when the resist is left for a comparatively long period of time in a high vacuum. Applicants respectfully submit that facing these problems, one of ordinary skill in the art would not have looked to JP '156, which is related to the knowledge on KrF resists which are exposed in the air, for solutions.

In view of the foregoing, Applicants respectfully submit that the present claims are not anticipated or rendered obvious by JP '156, and thus the rejections should be withdrawn.

IV. Response to Rejections Over Nishiyama et al

In Paragraph No. 9 of the Action, claims 1-2 and 14 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Nishiyama et al (US 2001/0008739 A1). Further, in Paragraph No. 10 of the Action, claims 1-2 and 14 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nishiyama et al.

Applicants respectfully submit that the amended claims are not anticipated or rendered obvious by Nishiyama et al. As noted above, Applicants have amended claim 1 to incorporate the subject matter of claim 3, which is not included in the rejections.

Moreover, the Examiner's position appears to be that the first three repeating units in formula (IV-15) of Nishiyama et al correspond to formulae (I), (III) and (II) recited in present claim 1, respectively. In particular, the Examiner considers that in the 3rd repeating unit in formula (IV-15) of Nishiyama et al, the crosslinked chain qualifies as a substituent.

Applicants respectfully submit that persons skilled in the art would not consider a crosslinked chain to be a substituent, contrary to the Examiner's assertion.

Further, as set forth above, the present invention has the object of solving the problems originating from the "exposure under a high vacuum" characteristic for electron beam- or EUV-resists, i.e., a large variation of line-width and the deterioration of line edge smoothness when the resist is left for a comparatively long period of time in a high vacuum. Applicants respectfully submit that facing these problems, one of ordinary skill in the art would not have looked to Nishiyama et al, which is related to the knowledge on KrF resists which are exposed in the air, for solutions.

In view of the foregoing, Applicants respectfully submit that the present claims are not anticipated or rendered obvious by Nishiyama et al, and thus the rejections should be withdrawn.

V. Response to Rejection Under 35 U.S.C. § 102 (a or e)

In Paragraph No. 11 of the Action, claims 1-9 and 11-14 are rejected under 35 U.S.C. § 102(a or e) as allegedly being anticipated by Blakeney et al (US 2003/0065101 A1) as optionally evidenced by Tsuei (U.S. Pat. No. 5,643,669) or Tsiartas et al (Macromolecules).

Applicants respectfully submit that the present claims are not anticipated by Blakeney et al, alone or evidenced by Tsuei or Tsiartas et al for at least the following reasons.

The present claims require that the polymer have a molecular weight dispersion degree of 1.5 or below.

Blakeney et al discloses a resin such as SE-11, which may correspond to the polymer recited in the present claims when Z is t-butyl and W is cyclohexylethyl. However, SE-11 has a degree of dispersion (PD) of 2.1, as shown in Table 1 (page 14). In addition, SE-13 and NSP-1, disclosed in Table 1 of Blakeney et al, also have molecular weight distributions larger than 1.5.

SE-4 disclosed in Blakeney et al uses a polymer having a dispersion of 1.2 as the backbone resin. However, Blakeney et al does not disclose the dispersity of SE-4 itself. Applicants believe that the degree of dispersion of SE-4 varies from that of the polymer, due to the cross-linking caused by a reaction. Therefore, Applicants respectfully submit that there are no sound reasons that SE-4 may have a dispersion of 1.2. Tsuei and Tsiartas et al do not rectify the deficiencies of Blakeney et al.

In view of the foregoing, Applicants respectfully submit that the present claims are not anticipated by Blakeney et al, alone or evidenced by Tsuei or Tsiartas et al, and thus the rejection should be withdrawn.

VI. Response to Claim Objection

In Paragraph No. 13 of the Action, claim 10 is objected to as being dependent from a rejected claim.

Applicants respectfully submit that the rejections of claim 1, from which claim 10 depends, have been overcome as set forth above, and thus the objection should be withdrawn.

VII. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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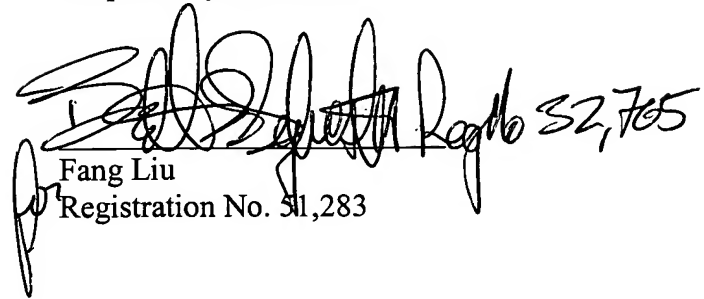
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